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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/986,057

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Paul F. Christopher

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ARNOLD & PORTER LLP  
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EXAMINER

WANG, QUAN ZHEN

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/986,057

Applicant(s)

CHRISTOPHER, PAUL F.

Examiner

Quan-Zhen Wang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

This Office Action is responsive to amendment filed on 12/29/2004.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1).

Regarding claim 1, Mendenhall et al. teach a satellite communication system comprising: a terrestrial base station (fig. 1B, 26); and a first satellite (fig. 1B, 10) communicating with said terrestrial base station using an infrared signal (optical beam, column 6, lines 63-64).

Regarding claim 15, Mendenhall et al. teach a terrestrial base station communication system comprising: a terrestrial based station (fig. 1B, 26) communicating with a first satellite (fig. 1B, 10) using an infrared signal (optical beam, column 6, lines 63-64).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-3, 7, 9-10, 14, 16-17, 21, 23-24, 28-29, 36-39, 46-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1).

Regarding claims 2-3 and 9-10, Mendenhall et al. teach a satellite communication system includes transmitting infrared signal (optical beam, column 6, lines 63-64) between the terrestrial base station (fig. 1B, 26) and the first satellite (fig. 1B, 10). Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically teach that the optimal location for transmitting the infrared signal is determined based on a frequency of the infrared signal and the attenuation of the infrared signal at the frequency. However, Badesha et al. disclose that clouds, rain, and fog can scatter optical beam energy and disrupt communications (page 1, paragraph 0005, lines 8-10). Badesha et al. further teach that one approach to mitigate the problem is to have several ground stations at different locations so that a transmission can be sent from the ground station that is least obstructed (optimal location) by clouds (page 1, paragraph 0006). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal location

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for transmitting and receiving the infrared signal based on a frequency of the infrared signal and the attenuation of the infrared signal at the frequency to provide a reliable communication capability.

Regarding claims 7 and 14, Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically teach to determine an optimal location based on the probability function of an elevation angle. However, Badesha et al. disclose that there are significant problems associated with the operation of optical communication systems in the atmosphere (page 1, paragraph 0005, lines 6-8). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal location based on the probability function of an elevation angle to reduce the distance for an optical signal to travel in the atmosphere.

Regarding claims 16-17 and 23-24, Mendenhall et al. disclose a terrestrial base station communication system includes transmitting infrared signal (optical beam, column 6, lines 63-64) between the terrestrial base station (fig. 1B, 26) and the first satellite (fig. 1B, 10). Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically disclose that the optimal location for transmitting the infrared signal is determined based on a frequency of the infrared signal and the attenuation of the infrared signal at the frequency. However, Badesha et al. disclose that clouds, rain, and fog can scatter optical beam energy and disrupt communications (page 1, paragraph 0005, lines 8-10). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal

location for transmitting the infrared signal based on a frequency of the infrared signal and the attenuation of the infrared signal at the frequency.

Regarding claims 21 and 28, Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically disclose to determine an optimal location based on the probability function of an elevation angle. However, Badesha et al. point out that there are significant problems associated with the operation of optical communication systems in the atmosphere. (page 1, paragraph 5, lines 6-8). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal location based on the probability function of an elevation angle to reduce the distance for an optical signal to travel in the atmosphere.

Regarding claims 29 and 39, Mendenhall et al. teach a satellite communication system includes transmitting infrared signal (optical beam, column 6, lines 63-64) between the terrestrial base station (fig. 1B, 26) and the first satellite (fig. 1B, 10). Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically teach the method for determining an optimal location for transmitting and receiving an infrared in a region. However, Badesha et al. teach that there are significant problems associated with the operation of optical communication systems in the atmosphere (page 1, paragraph 0005), because the clouds, fog can absorb and scatter the optical beam. Badesha et al. further teach that one approach to mitigate the problem is to have several ground stations at different locations so that a transmission can be sent from the ground station that is least obstructed by clouds (page 1,

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paragraph 0006). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal location for transmitting and receiving the infrared signal to provide a reliable transmission capability.

Regarding claims 36-38, and 46-48, Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically disclose to determine an optimal location based on the probability function of an elevation angle. However, Badesha et al. disclose that there are significant problems associated with the operation of optical communication systems in the atmosphere. (page 1, paragraph 0005, lines 6-8). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal location based on the probability function of an elevation angle to reduce the distance for an optical signal to travel in the atmosphere.

Regarding claims 49-51, Mendenhall et al. disclose a satellite communication system includes transmitting infrared signal (optical beam, column 6, lines 63-64) between the terrestrial base station (fig. 1B, 26) and the first satellite (fig. 1B, 10). Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically disclose that the optimal location for transmitting and receiving the infrared signal is determined based on a frequency of the infrared signal and the attenuation of the infrared signal at the frequency; and the attenuation is based one the cloud water content persistent in the region. However, Badesha et al. point out that clouds, rain, and fog can scatter optical beam energy and disrupt communications (page 1,

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paragraph 5, lines 8-10). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to determine an optimal location for transmitting and receiving the infrared signal based on a frequency of the infrared signal and the attenuation of the infrared signal at the frequency and locate the terrestrial station at the optimal location to provide a reliable communication capability.

5. Claims 4, 11, 18 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and further in view of Mesecher (U.S. Patent US 6,603,800 B1).

Regarding claims 4, 11, 18, and 25, Mendenhall et al. and Badesha et al. differ from the claimed invention in that Mendenhall et al. and Badesha et al. do not specifically teach that an optimal location is defined by longitude and latitude. However, Mesecher teaches to describe the location of a base station using longitude and latitude (column 4, lines 54-55). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to define the optimal location by longitude and latitude in order to define the definitive location of the optimal location of the station using a recognized coordinate system.

6. Claims 5, 12, 19, 26, 30-35 and 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of

Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and further in view of Pfeiffer et al. (U.S. Patent US 5,960,097).

Regarding claims 5, 12, 19, 26, 30-35 and 40-45, Mendenhall et al. and Badesha differ from the claimed invention in that Mendenhall et al. and Badesha do not specifically teach to determine the cloud water content based on an exceedance probability. However, Pfeiffer et al. teach to use exceedance probability method to analyzing the influence of background clutter on a missile detection and tracking system (column 11, line 67 to column 12, line 2). The problem is analog to the signal degradation of the satellite communication system by water content in the clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply the exceedance probability method taught by Pfeiffer et al. to the system taught by Mendenhall et al. and Badesha et al. in order to analyze the influence of the clouds on the satellite signals.

7. Claims 6, 13, 20, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and further in view of Chu et al. (The Bell System Technical Journal, May-June 1968 Volume 47, Number 5, Page 723-759).

Regarding claims 6, 13, 20, and 27, Mendenhall et al. and Badesha differ from the claimed invention in that Mendenhall et al. and Badesha do not specifically teach to determine the cloud water content based on cloud water content formula. However,

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Chu et al. teach to use cloud water content formula (equations 9, and 12) to study the signal degradation caused by clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply cloud water content formula to the system taught by Mendenhall et al. and Badesha et al. in order to analyze the influence of clouds on the satellite signals.

8. Claims 8 and 22 are rejected under 35 U.S.C. 103(a) as being anticipated by Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Ross et al. (U.S. Patent US 5,218,467).

Regarding claim 8 and 22, Mendenhall et al. teach a satellite communication system includes transmitting infrared signal (column 6, lines 63-64) between the terrestrial base station (fig. 1B, 26) and the first satellite (fig. 1B, 10). Mendenhall et al. differ from the claimed invention in that Mendenhall et al. do not specifically teach to include a second satellite, a third satellite, a fourth satellite, and a fifth satellite, and the first satellite, second satellite, and third satellite each being in a phased Molniya orbit, and the satellite communication system of claim 1, further comprising at least a fourth satellite and fifth satellite each being in a geosynchronous orbit. However, Ross et al. teach a satellite communication system have a geosynchronous satellite (fig. 1, 1) communicating with six Molniya orbit satellites. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include more than one geosynchronous satellites and plurality of Molniya orbit satellites in the

satellite communication system taught by Mendenhall et al. to increase the area that the satellite communication system covers.

### ***Response to Arguments***

9. Applicant's arguments filed 12/29/2004 have been fully considered but they are not persuasive.

Regarding claims 1 and 15, the Applicant argues "the Mendenhall filing on an optical tucker is a key subset of a satellite communication system. It does not, however, address the viability of a satellite communication system with the necessary considerations of geographic location, atmospheric attenuation satellite orbits, and frequency selection". The Applicant further argues "the Christopher filling ... assures the viability of the satellite communication system by noting the key relations between location, satellite orbits, and atmospheric attenuation for optimum frequency selection. A good s choice of orbits (e.g., Molniya combined with antipodal Geostationary satellites) allowed optimum millimeter wave frequency choices as shown in Att. 3 (Ka conference, Cleveland, June 2000)." However, these arguments do not relate to the rejections of the claims because the argued terminologies are not supported by the claims. Claim 1 reads "A satellite communication system comprising: a terrestrial base station; and a first satellite communicating with said terrestrial base station using a infrared signal." Claim 15 reads "A terrestrial base station communication system comprising: a terrestrial base station communicating with a first satellite using an infrared signal."

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Both claims are clearly anticipated by the cited reference, as shown in the rejections.

Therefore, the rejections of claims 1 and 15 still stand.

Regarding claims 2-3, 7, 9-10, 14, 16-17, 21, 23-24, 28-29, 36-39, and 46-51, the Badesha has a provisional application filed on Jan. 10, 2000, which precedes the effective filing date of the instant application, Nov. 7, 2000. In addition, the Applicant tries to argue that the communication using "infrared" is different from "optical communication" and "cloud attenuation maps were not available until the SPIE conference of Jan 2001". However, argued terminologies are not supported by the claims. For example, without specifying the wavelength or the frequency of "infrared", the "optical communication" reads the communication using "infrared", because the "optical communication" indeed uses "infrared" light ( $\lambda=1550$  nm) as carrier of the information. Therefore, the combination of the cited references discloses all the limitations of the claims and the rejections of claims 2-3, 7, 9-10, 14, 16-17, 21, 23-24, 28-29, 36-39, and 46-51 still stand. For the same reasons, the rejections of claims 4, 11, 18, 25, 5, 12, 19, 26, 30-35, and 40-45 also stand.

Regarding claims 6, 13, 20, and 27, the Applicant tries to disqualify the reference Chu by stating "the inventor sent Chu and Hogg to the PTO in 2001" and "the copy of Chu and Hogg in the November 2004 mailing still bears Christopher's library stamp". However, Chu and Hogg were published in 1968! Whether the reference bears the inventor's library stamp or not does not change the fact that the cited reference has been available for public since 1968. A qualified reference available for public can be

used to reject a patent application, regardless the reference is provided by the Applicant or not. See MPEP § 2144 and § 2146.

Regarding claims 8 and 22, again, the argued terminologies are not supported by the claims. In addition, the Applicant admits that "June 2000 was the first time comprehensive elevation statistics for all time were shown". However, the effective filing date of instant application is November 7, 2000.

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571)

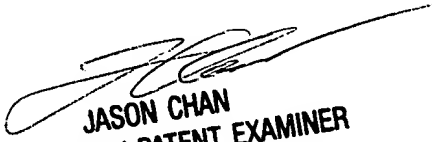
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272-3114. The examiner can normally be reached on 8:30 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qzw  
1/3/2006

  
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